CLAIMS

What is claimed is:

1. A process for discreetly loading a solid carrier particle having a size less than 100 nm, with a liquid, the process comprising the steps of:

(a) metering a liquid into a flow restrictor;

(b) injecting a gas stream through the flow restrictor concurrently with step (a) to (i) atomize the liquid and (ii) create turbulent flow of the gas stream and the atomized liquid, wherein the gas stream is optionally heated; and

(c) adding the solid carrier particle to the region of turbulent flow concurrently with steps (a) and (b), wherein the solid carrier particle mixes with the atomized liquid to load the solid carrier particle with the liquid,

wherein such process provides a solid carrier particle discreetly loaded 60% or greater, by total weight of the loaded carrier particle, with liquid.

2. The process of Claim 1, wherein said solid carrier particle is selected from silicas, titanium dioxide, zeolites, alumina, carbon nanotubes, activated carbon, carbon black and pigments.

3. The process of Claim 1 wherein said liquid is an aqueous liquid.

4. The process of Claim 1 wherein said liquid is a nonaqueous liquid.

5. The process of Claim 1 wherein said liquid is selected from fats, oils, lipids, organic liquid solvents, molten polymers, liquid pharmaceuticals and nutraceuticals, and solutions of proteins, carbohydrates, sugars, salts, and minerals.

6. The process of Claim 1, wherein said liquid is selected from polyunsaturated fatty acids.

7. The process of Claim 1, wherein said solid carrier particle is silica and said liquid is polyunsaturated fatty acid.

8. The process of Claim 1, further comprising repeating steps (a) - (c) at least once wherein the liquid is the same or different.

9. The process of Claim 1, further comprising coating the liquid-loaded solid carrier particle of step (c) with a functional coating material, comprising the steps of:

(d) metering a coating liquid into a flow restrictor;

(e) injecting a gas stream through the flow restrictor concurrently with step (a) to (i) atomize the liquid and (ii) create turbulent flow of the gas stream and the atomized

coating liquid, wherein the gas stream is optionally heated; and

(f) adding the liquid-loaded solid carrier particle to the region of turbulent flow concurrently with steps (a) and (b), wherein the liquid-loaded solid carrier particle mixes with the atomized coating liquid to coat the liquid-loaded solid carrier particle with the coating liquid,

to provide a liquid-loaded carrier particle coated with a functional coating.

10. The process of Claim 9, wherein said functional coating is selected from polyunsaturated fatty acids, hydrogenated soybean oils, liquid sucrose, and solutions of sucrose, maltodextrose, zein, casein, gelatin, soy proteins, whey proteins, and sodium chloride, and slurries of titanium dioxide.

11. The process of Claim 9, wherein said functional coating is selected from liquid sweetening agents, food flavoring agents, food flavoring enhancers, food colors, food aroma agents, anti-caking agents, humectants, antimicrobial agents, antioxidants, surface modifying agents, nutritional supplementing agents, proteins, carbohydrates, lipids and minerals.

12. The process of Claim 9, wherein said liquid-loaded carrier particle of step (c) is comprised of silica loaded with a polyunsaturated fatty acid, and wherein said functional coating material is a solution of sucrose.

13. The process of Claim 1, further comprising encapsulating the liquid-loaded solid carrier particle of step (c) with a liquid encapsulating material, comprising the steps of:

(d) metering a liquid encapsulating material into a flow restrictor;

(e) injecting a gas stream through the flow restrictor concurrently with step (a) to (i) atomize the liquid encapsulating material and (ii) create turbulent flow of the gas stream and the atomized liquid encapsulating material, wherein the gas stream is optionally heated; and

(f) adding the liquid-loaded solid carrier particle to the region of turbulent flow concurrently with steps (a) and (b), wherein the liquid-loaded solid carrier particle mixes with the atomized liquid encapsulating material to encapsulate

the liquid-loaded solid carrier particle with the liquid encapsulating material,

to provide an encapsulated liquid-loaded carrier particle.

14. A composition comprising discreetly liquid-loaded solid carrier particles; wherein the solid carrier particles have a size under 100 nm; wherein the liquid loaded onto the solid carrier particles is 60% or greater, by total weight of the composition; and wherein the composition has the handling characteristics of a dry flowable powder.

15. The composition of Claim 14, wherein the solid carrier particle is selected from the group consisting of silicas, titanium dioxide, zeolites, alumina, carbon nanotubes, activated carbon, carbon black, and pigments.

16. The composition of Claim 14, wherein the solid carrier particle is silica and the nonaqueous liquid is one or more polyunsaturated fatty acid.

17. The composition of Claim 16 wherein the polyunsaturated fatty acid is selected from the group consisting of including gamma-linolenic acid (GLA), dihomo-gamma-linolenic acid, arachidonic acid (ARA), docosahexaenoic acid (DHA), eicosapentaenoic acid (EPA), or combinations thereof.

18. A liquid-loaded carrier particle produced by the method of Claim 1.

19. A liquid-loaded carrier particle coated having a functional coating, produced by the method of Claim 9.

20. An encapsulated liquid-loaded carrier particle produced by the method of Claim 13.